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AMPHIBIANS OF THE VICTORIAN MALLEE

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Abstract

The known anuran amphibian fauna of the Victorian Mallee consists of 12 taxa (11 species, one of which includes two call races). Available distributional data for the area are given for each form, together with associated field observations. Some broad zoogeographic patterns which are apparent in the frogs of this part of Victoria are briefly discussed.

Introduction

The only published information on the amphibians of the Victorian Mallee consists of four locality records for 3 species. The following account is based mainly on observations and collections which constitute part of a more general survey of the amphibians of SE. Australia. It should be pointed out that our knowledge of the amphibians of the Mallee is still at a very preliminary stage and that most of the available information concerns species composition and geographic distribution. A little is known about the general ecology of the Mallee frogs, but almost nothing about the problems of physiological adaptation by these species to the arid conditions of parts of the region.

For the present purposes the definition of the Mallee as used by Rawlinson (this volume) is followed, namely, that area of Victoria bounded in the north by the Murray R., in the west by the State border, in the east by longitude 144°E., and in the south by latitude 36° 30′ S.

All specimens examined are housed in the University of Melbourne, Zoology Department Collection. Literature records, where available, are given in the particular species accounts. Mating calls are reliable indicators of species identity and these were generally obtained by logging breeding choruses during night road traverses. Only localities additional to those where specimens were collected are listed in the sections on voice records (with the exception of the *Limnodynastes tasmaniensis* complex where two sibling call races are present). Specimens or voice records within a 5-mile radius of a town are generally included under the one locality (and the term 'area' added). Only those field observations made within the Mallee region are listed, but most of the literature references apply to the species in general.

Hylidae

Hyla aurea (Lesson)

Localities

Specimens: Lock No. 9, Murray R.; 3 miles E. of Mildura; L. Cullulleraine; 6 miles SE. of Red Cliffs; Carwarp; Nangiloc; Boundary Bend area; Nyah; Sea Lake; Wycheproof; 16 miles W. of Nhill; Kaniva.

Voice Records: Mildura; Annuello; L. Boga; 5 miles NW. of Dimboola; Wail; 15 miles W. of Kaniva.

Field Observations

The voice records were obtained during October. This species breeds in relatively permanent lakes, lagoons and dams. Males call while floating in open water.

Remarks

The populations of the Mallee are typical of the subspecies *raniformis* (Parker 1938). This subspecies has a wide distribution in SE. Australia, extending into the E. half of the Mallee and along the Murray R. valley into South Australia. A general account of the species is given by Moore (1961). Adult morphology and breeding biology of *H. aurea raniformis* are briefly described by Littlejohn (1963), and larval morphology by Martin (1965).

Hyla ewingi Duméril & Bibron

Localities

Specimens: None.

Voice Records: 2 miles S. of Serpentine.

Field Observation

Heard calling at the above locality during late October.

Remarks

Though very common to the south and south-east of the Mallee, *H. ewingi* barely reaches the SE. corner of the defined area. The adult morphology and breeding biology are briefly described by Littlejohn (1963), and larval morphology by Martin (1965). Geographic distribution, mating call structure, and relationship with *H. verreauxi* Duméril are discussed by Littlejohn (1965b).

Hyla peroni (Tschudi)

Localities

Specimens: 3 miles E. of Mildura; L. Cullulleraine; 2 miles N. of Nangiloe; Hattah Lakes; Nyah.

Voice Records: Lock No. 9, Murray R.; Mildura; 2 miles W. of Boundary Bend; Wemen; 2 miles S. of Serpentine.

Literature Record: Kerang (Copland 1957).

Field Observations

All voice records of this species were obtained during October. Males call from elevated positions in marginal or emergent vegetation of permanent lakes and lagoons.

Remarks

This species is restricted to the Murray R. valley and its associated drainage (Avoca and Loddon R.) in the Mallee. However, it has a more general distribution in E. Victoria (Littlejohn, Martin, & Rawlinson 1963) and E. New South Wales (Moore 1961). Moore (1961) gives a description of this species.

Leptodactylidae

Crinia parinsignifera Main

Localities

Specimens: Lock No. 9, Murray R.; L. Cullulleraine; Red Cliffs Pumps, Murray R.; 10 miles SE. of Robinvale; Hattah Lakes; Boundary Bend area; Durham Ox.

VOICE RECORDS: 5 miles W. of Loek No. 9, Murray R.; Mildura area; 6 miles SE. of Red Cliffs; Nangiloe; 18 miles W. of Boundary Bend; Boundary Bend; Wemen; Nyah West; 2 miles N. of Mystic Park; Kerang area; 9 miles S. of Kerang; 14 miles N. of Durham Ox; Wyeheproof; 3 miles SW. of Boort; 6 miles S. of Durham Ox; 1 mile S. of Bears Lagoon; 2 miles S. of Warraeknabeal; 17 miles E. of Nhill; Donald; 5 miles NW. of Dimboola.

LITERATURE RECORDS: L. Cullulleraine; Warracknabeal (Main 1957).

FIELD OBSERVATIONS

C. parinsignifera has been heard calling in late April, August, and Oetober. Breeding sites range from shallow temporary roadside pools to the margins of permanent lakes and lagoons. Males call from the edges of ponds or from positions just above the water in emergent grasses.

REMARKS

This common speeies, whieh is wide-ranging farther east, is restrieted to the N., E., and S. boundaries of the Mallee. Main (1957) gives some information on distribution and breeding biology. Mating eall strueture and ealling behaviour have been diseussed by Littlejohn (1958, 1959).

Crinia signifera Girard

LOCALITIES

SPECIMENS: 2 miles NW. of Wedderburn.

VOICE RECORDS: Nyah; L. Boga; 2 miles N. of Mystie Park; Kerang area; 9 miles S. of Kerang; 14 miles N. of Durham Ox; 8 miles N. of Durham Ox; Durham Ox; 3 miles SW. of Boort; 6 miles S. of Durham Ox; 1 mile S. of Bears Lagoon; 17 miles W. of Kaniva; Kaniva; 17 miles E. of Nhill; 5 miles NW. of Dimboola; Wail.

FIELD OBSERVATIONS

This species has been heard ealling in late April, August, September, and Oetober. Males eall from the edges of temporary ponds.

REMARKS

The distribution of *C. signifera* in the Mallee is similar to that of *C. parinsignifera*, but is not as extensive along the Murray R. *C. signifera* is a eommon and wide-ranging speeies in SE. Australia. A general aeeount of the *C. signifera* eomplex is given by Moore (1961). The adult morphology and breeding biology of *C. signifera* are diseussed by Littlejohn (1958, 1959, 1963); there are also detailed eonsiderations of mating eall strueture (Littlejohn 1958, 1959, 1964). Larval morphology and development are deseribed by Martin (1965) and Littlejohn & Martin (1965a).

Limnodynastes dorsalis (Gray)

LOCALITIES

SPECIMENS: 6 miles SE. of Red Cliffs; Carwarp; Nangiloe; 10 miles N. of Hattah; 7 miles S. of Ouyen; 10 miles W. of Mittyaek; Nyah; Nullawil; Wyeheproof; Sea Lake; Kerang area; 17 miles W. of Kaniva; 2 miles S. of Serpentine.

VOICE RECORDS: Mildura area; Wemen; Annuello; Manangatang; 7 miles W. of Nyah; L. Boga; 16 miles N. of Culgoa; Culgoa; 2 and 7 miles S. of Warraeknabeal; Donald; Kaniva; 5 miles NW. of Dimboola; Wail.

LITERATURE RECORD: L. Boga (Krefft 1866).

FIELD OBSERVATIONS

Calls of this species have been heard in March, August, September, and October. Egg masses were seen during March. Breeding sites are variable, ranging from large temporary ponds to fairly permanent lakes, lagoons, and dams. Males generally call from water, under cover of overhanging or emergent vegetation, but sometimes from the adjacent banks.

REMARKS

The populations of the Mallee may be assigned to the subspecies *dumerili* (Martin pers. comm.). *L. dorsalis* is a wide-ranging species through the S. and E. Mallee and along the Murray R. into South Australia. The taxonomy and general biology of the *L. dorsalis* complex is discussed by Moore (1961). There are also recent short accounts of breeding biology (Littlejohn 1963), larval morphology (Martin 1965), and mating call structure (subspecies *insularis*) (Littlejohn & Martin 1965c).

Limnodynastes fletcheri Boulenger

LOCALITIES

SPECIMENS: Lock No. 9, Murray R.; 3 miles E. of Mildura; L. Cullulleraine; Hattah Lakes; 5 miles W. of Boundary Bend.

VOICE RECORDS: Mildura; Nangiloc; 2 and 18 miles W. of Boundary Bend; L. Boga; Kerang area.

FIELD OBSERVATIONS

This species has been heard calling in March and October, and two egg masses were collected in late October. Males call from the water, supported and concealed by emergent vegetation. Breeding sites are large, fairly permanent bodies of water.

REMARKS

Within the Mallee this species is restricted to the Murray R. system. It is a characteristic frog of the other large rivers of the W. plains. The mating call, which has not been described elsewhere, is a soft, short single note with a quality similar to the bark of a distant dog. Moore (1961) discusses the morphology and distribution of this species.

Limnodynastes tasmaniensis Günther

Two allopatric call races (Northern and Southern) can be recognized within this species. The Northern Call Race ranges through SE. Queensland, E. New South Wales, and NE. Victoria, then along the Murray Valley into S. South Australia (Littlejohn unpub. obs.). This form has a mating call consisting of 2-5 short pulses which are rapidly repeated so that the sound has a staccato quality. Presumably, it was this call race which was studied by Moore (1961), for his description of the mating call agrees with that given above.

The Southern Call Race occurs mainly S. of the Dividing Range in Victoria (except in the W. part of the State), with an extension into SE. South Australia. It also occurs on Flinders Is. and Tasmania (Littlejohn & Martin 1965b). The mating call of the Southern Call Race is a single short pulse or 'click' (Littlejohn 1963) and has been described in detail by Littlejohn & Martin (1965c).

Where the geographic ranges of the two forms contact, zones of intergradation are produced, in which the individual frogs may be heard producing both single

and multiple pulsed calls within the one calling sequence (Littlejohn unpub. obs.). Both forms occur in the Victorian Mallee and an intergrade zone runs along the E. boundary. Since the two call races cannot presently be recognized on external adult morphology, the specimens examined are grouped together; but voice records are separated into three categories: Northern Call Race, Southern Call Race, and Intergrades.

Localities

Specimens: L. Cullulleraine; Red Cliffs Pumps, Murray R.; Hattah Lakes; 10 miles SE. of Robinvale; 5 miles W. of Boundary Bend; Nyah; Sea Lake; 5 miles S. of Kerang; Wycheproof.

Voice Records:

Northern Call Race: Lock No. 9, Murray R.; Mildura; L. Cullulleraine; 6 miles SE. of Red Cliffs; Carwarp; Nangiloc; 2 and 18 miles W. of Boundary Bend; Wemen; Nyah.

Southern Call Race: Manangatang; 7 miles S. of Ouyen; Chinkapook; 4 miles E. of Chinkapook; 8 miles S. of Nandaly; 15 miles N. of Sea Lake; Sea Lake; 16 miles N. of Culgoa; Culgoa; 6 miles N. of Nullawil; Nullawil; 2 and 10 miles S. of Warracknabeal; 17 miles W. of Kaniva; Kaniva; 8 and 12 miles E. of Kaniva; 9 miles W. of Nhill; 17 miles E. of Nhill; 5 miles NW. of Dimboola.

Intergrades: Kerang area; 8 and 14 miles N. of Durham Ox; Durham Ox; 3 miles SW. of Boort; 2 miles S. of Serpentine.

Field Observations

Both races have been heard calling in March, August, September, and October. Eggs of the Southern Call Race were seen in late September. Breeding sites vary from river lagoons to temporary roadside ponds. Males call from the water, supported by emergent grasses.

Remarks

See the discussion in the introductory section for this species.

Neobatrachus centralis (Parker)

Localities

Specimens: 10 miles SE. of Underbool; 7 miles S. of Ouyen; 3 and 10 miles W. of Mittyack; Nandaly; 10 miles NW. of St Arnaud.

Voice Records: 8 miles S. of Nandaly; 9 miles W. of Nhill.

Field Observations

This species has been heard calling in March and August; recent egg masses were seen at the same time. *N. centralis* breeds in temporary ponds and dams. Males call while floating in open water.

Remarks

N. centralis appears to be the most arid-adapted of the species occurring in the Mallee and penetrates the drier parts of the continent, extending from the Mallee across to S. Western Australia (Main, Lee, & Littlejohn 1958). Littlejohn (1965a) has figured an audiospectrogram of the mating call of this species in Victoria, and the mating call of a Western Australian individual is described and figured by Littlejohn & Main (1959). Main (1965) gives a short description of the morphology and biology of *N. centralis* from S. Western Australia.

Neobatrachus pictus Peters

Localities

Specimens: 7 miles S. of Ouyen; 4 miles S. of Culgoa; 10 miles NW. of St Arnaud.

Voice Records: 3 and 13 miles W. of Mittyack; Chinkapook; Nandaly; 8 miles S. of Nandaly; L. Boga area; Durham Ox.

Field Observations

Males have been heard calling in March and August, and fresh spawn was collected in March. Breeding sites are similar to those of *N. centralis* and males call while floating in open water.

Remarks

This species has an extensive E. and SW. distribution in SE. Australia and a large area of drier parts of the Mallee is included wthin its range. Moore (1961) gives a general description of the species, and Littlejohn (1963) has given a short account of adult morphology and breeding behaviour. An audiospectrogram of the mating call is figured by Littlejohn (1965a) and the larva is described by Martin (1965).

Pseudophryne bibroni Günther

Localities

Specimens: None.

Voice Records: Durham Ox; 3 miles SW. of Boort; 6 miles S. of Durham Ox; 10 miles NW. of St Arnaud.

Field Observations

This species was heard calling in late April and early May.

Remarks

Specimens from adjacent localities (e.g. Koondrook, 9 miles N. of Bendigo, 5 miles N. of Glenorchy, and Mt Arapiles) are clearly assignable to *P. bibroni* so that there can be little doubt about the identification of the calls heard in the SE. Mallee. Mating calls of the three Victorian species of *Pseudophryne—bibroni, dendyi* Lucas, and *semimarmorata* Lucas—are very similar (Littlejohn 1963 and unpub. obs.), but the nearest known populations of another congeneric species are those of *P. semimarmorata* in the Grampians (unpub. obs.). A general account of *P. bibroni* is provided by Moore (1961); adult morphology and breeding biology are briefly described by Littlejohn (1963), and larval morphology by Martin (1965).

Discussion and Summary

Twelve taxa (11 species, one of which contains two call races) are known to occur in the Victorian Mallee as defined in the introduction. However, this number may be increased with more detailed collecting in the north-west, particularly following heavy summer rains.

Krefft (1866) lists *Hyla caerulea* (White) (as *Pelodryas caeruleus*) among the vertebrates of the lower Murray and Darling Rivers. No specific locality is given but the party was based at Gol Gol, New South Wales (opposite Mildura) for about nine months. Moore (1961) has summarized the known distribution of *H. caerulea* and lists specimens from the Darling R. (as Darling R. floods). We

have not yet had any success in finding this species along the Murray R. and, for the present, must consider Krefft's record as referring to the Darling some distance above its junction with the Murray.

Three other species are listed by Krefft (1866) from the same general area, but again, no precise localities are given: *H. aurea* and *H. peroni* (already considered), and *Hyla adelaidensis* Gray. As we presently understand it, this latter species is restricted to Western Australia and it is not at all clear to which currently recognized SE. form his report can refer.

Two main zoogeographic patterns are evident in the distribution of Mallee frogs:

(1) The Murray R. valley is an important corridor for amphibians allowing 6 species to penetrate the otherwise inhospitable N. Mallee environment.

(2) Excluding the Murray R. valley, the Mallee represents a zone of subtraction from SE. (9 forms) to NW. (probably only one form, *N. centralis*). Presumably this is in response to the conditions imposed by the gradient of increasing aridity, which exerts a powerful influence on amphibian distribution.

Individual taxa may also be categorized and grouped into faunal components, of which five are recognizable:

(1) Central Australian—desert adapted forms which penetrate into the Mallee from the north-west. *N. centralis* clearly falls into this category as the only true desert species inhabiting the area.

(2) Riverine—forms restricted to the Murray R. valley and the larger rivers which cut across the Mallee and drain into the Murray. *H. peroni* and *L. fletcheri* are typical river frogs with this distributional pattern.

(3) Bassian—S. cool temperate adapted forms which penetrate into the Mallee from the south to varying degrees. *H. ewingi* and the Southern Call Race of *L. tasmaniensis* meet these requirements.

(4) Eyrean—SE. warm temperate adapted forms with ranges mainly N. and W. of the Dividing Range. *Crinia parinsignifera, L. dorsalis dumerili,* and *N. pictus* have these characteristics.

(5) Wide-ranging forms—the remaining taxa, *C. signifera, H. aurea raniformis,* and the Northern Call Race of *L. tasmaniensis* cannot be clearly assigned to any of the above categories because of their extensive distributions in SE. Australia.

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